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1   Tensor norms and the classical communication complexity of nonlocal quantum measurement

Yaoyun Shi
May 2005   STOC '05: Proceedings of the thirty-seventh annual ACM symposium on Theory of computing
Publisher: ACM

Full text available: Pdf (202.30 KB)   Additional Information: full citation, abstract, references, index terms

Bibliometrics: Downloads (6 Weeks): 5,   Downloads (12 Months): 53,   Citation Count: 0

Nonlocality is at the heart of quantum information processing. In this paper we investigate the minimum amount of classical communication required to simulate a nonlocal quantum measurement. We derive general upper bounds, which in turn translate to ...

Keywords: bell inequality, classical simulation, communication complexity, fourier sampling problem, quantum entanglement, tensor norms

2   On communication over an entanglement-assisted quantum channel

Ashwin Nayak, Julia Salzman
May   STOC '02: Proceedings of the thiry-fourth annual ACM symposium on Theory
2002   of computing
Publisher: ACM

Full text available: Pdf (172.21 KB)   Additional Information: full citation, abstract, references, cited by, index terms

Bibliometrics: Downloads (6 Weeks): 0,   Downloads (12 Months): 30,   Citation Count: 2

Shared entanglement is a resource available to parties communicating over a quantum channel, much akin to public coins in classical communication protocols. Whereas shared randomness does not help in the transmission of information, or significantly ...

Keywords: communication complexity, entanglement-assisted quantum channel, quantum communication

3   Bounded-error quantum state identification and exponential separations in communication complexity

Dmitry Gavinsky, Julia Kempe, Oded Regev, Ronald de Wolf
May   STOC '06: Proceedings of the thirty-eighth annual ACM symposium on Theory
2006   of computing
Publisher: ACM

Full text available: Pdf (285.55 KB)   Additional Information: full citation, abstract, references, index terms

Bibliometrics: Downloads (6 Weeks): 1,   Downloads (12 Months): 45,   Citation Count: 1

We consider the problem of bounded-error quantum state identification: given either state α_0 or state α_1, we are required to output '0', '1' or 'DONO' ("don't know"), such that conditioned on outputting '0' or '1', our ...

Keywords: communication complexity, entanglement, quantum computing, randomness, state identification

4   The pattern matrix method for lower bounds on quantum communication

Alexander A. Sherstov
May   STOC '08: Proceedings of the 40th annual ACM symposium on Theory of
2008   computing
Publisher: ACM

Full text available: Pdf (285.52 KB)   Additional Information: full citation, abstract, references, index terms

Bibliometrics: Downloads (6 Weeks): 16,   Downloads (12 Months): 60,   Citation Count: 0

In a breakthrough result, Razborov (2003) gave optimal lower bounds on the communication complexity of every function f of the form $f(x,y) = D(|x$ AND $y|)$ for some $D:\{0,1,...,n\} \rightarrow \{0,1\}$, in the bounded-error quantum model with and without prior entanglement. ...

Keywords: approximate degree of boolean functions, bounded-error communication, lower bounds, quantum communication complexity

5 Exponential separations for one-way quantum communication complexity, with applications to cryptography

Dmitry Gavinsky, Julia Kempe, Iordanis Kerenidis, Ran Raz, Ronald de Wolf
June 2007   STOC '07: Proceedings of the thirty-ninth annual ACM symposium on Theory of computing
Publisher: ACM

Full text available: Pdf (303.17 KB)   Additional Information: full citation, abstract, references, index terms

Bibliometrics: Downloads (6 Weeks): 11,   Downloads (12 Months): 101,   Citation Count: 0

We give an exponential separation between one-way quantum and classical communication protocols for twopartial Boolean functions, both of which are variants of the Boolean Hidden Matching Problem of Bar-Yossef et al. Earlier such an exponential separation ...

Keywords: communication complexity, cryptography, quantum

6 Exponential separation of quantum and classical one-way communication complexity

Ziv Bar-Yossef, T. S. Jayram, Iordanis Kerenidis
June 2004   STOC '04: Proceedings of the thirty-sixth annual ACM symposium on Theory of computing
Publisher: ACM

Full text available: Pdf (244.61 KB)   Additional Information: full citation, abstract, references, cited by, index terms

Bibliometrics: Downloads (6 Weeks): 0,   Downloads (12 Months): 33,   Citation Count: 5

We give the first exponential separation between quantum and bounded-error randomized one-way communication complexity. Specifically, we define the Hidden Matching Problem HMn: Alice gets as input a string $x \in (0, 1)^n$ and ...

Keywords: communication complexity, hidden matching, quantum computation, separation

7 On quantum and probabilistic communication: Las Vegas and one-way protocols

Hartmut Klauck
May 2000   STOC '00: Proceedings of the thirty-second annual ACM symposium on Theory of computing
Publisher: ACM

Full text available: Pdf (917.21 KB)   Additional Information: full citation, references, cited by, index terms

Bibliometrics: Downloads (6 Weeks): 1,   Downloads (12 Months): 31,   Citation Count: 7

8 Interaction in quantum communication and the complexity of set disjointness

Hartmut Klauck, Ashwin Nayak, Amnon Ta-Shma, David Zuckerman
July 2001   STOC '01: Proceedings of the thirty-third annual ACM symposium on Theory of computing
Publisher: ACM

Full text available: Pdf (256.93 KB)   Additional Information: full citation, abstract, references, cited by, index terms

Bibliometrics: Downloads (6 Weeks): 2,   Downloads (12 Months): 23,   Citation Count: 9

One of the most intriguing facts about communication using quantum states is that these states cannot be used to transmit more classical bits than the number of qubits used, yet in some scenarios there are ways of conveying information with exponentially ...

9 Quantum vs. classical communication and computation

Harry Buhrman, Richard Cleve, Avi Wigderson
May 1998   STOC '98: Proceedings of the thirtieth annual ACM symposium on Theory of computing
Publisher: ACM

Full text available: Pdf (832.00 KB)   Additional Information: full citation, references, cited by, index terms

Bibliometrics: Downloads (6 Weeks): 6,   Downloads (12 Months): 114,   Citation Count: 24

10 Exponential separation of quantum and classical communication complexity

Ran Raz

May 1999   STOC '99: Proceedings of the thirty-first annual ACM symposium on Theory of computing

Publisher: ACM

Full text available: Pdf (872.24 KB)   Additional Information: full citation, references, cited by, index terms

Bibliometrics: Downloads (6 Weeks): 0,   Downloads (12 Months): 19,   Citation Count: 12

11 The effect of communication costs in solid-state quantum computing architectures

Dean Copsey, Mark Oskin, Tzvetan Metodiev, Frederic T. Chong, Isaac Chuang, John Kubiatowicz

June 2003   SPAA '03: Proceedings of the fifteenth annual ACM symposium on Parallel algorithms and architectures

Publisher: ACM

Full text available: Pdf (149.00 KB)   Additional Information: full citation, abstract, references, cited by, index terms

Bibliometrics: Downloads (6 Weeks): 3,   Downloads (12 Months): 51,   Citation Count: 6

Quantum computation has become an intriguing technology with which to attack difficult problems and to enhance system security. Quantum algorithms, however, have been analyzed under idealized assumptions without important physical constraints in mind. ...

Keywords: quantum architecture, quantum computing, silicon-based quantum computing

12 Smaller Two-Qubit Circuits for Quantum Communication and Computation

Vivek V. Shende, Igor L. Markov, Stephen S. Bullock

February 2004   DATE '04: Proceedings of the conference on Design, automation and test in Europe - Volume 2,   Volume 2

Publisher: IEEE Computer Society

Full text available: Pdf (155.53 KB)   Additional Information: full citation, abstract, references, cited by, index terms

Bibliometrics: Downloads (6 Weeks): 2,   Downloads (12 Months): 27,   Citation Count: 2

We show how to implement an arbitrary two-qubit unitary operation using any of several quantum gate libraries with small a priori upper bounds on gate counts. In analogy to library-less logic synthesis, we consider circuits and gates in terms of the ...

13 Long distance quantum communication using quantum error correction

Robert M. Gingrich, Hwang Lee, Jonathan P. Dowling
January   WISICT '04: Proceedings of the winter international synposium on
2004   Information and communication technologies
Publisher: Trinity College Dublin

Full text available: Pdf (103.28 KB)   Additional Information: full citation, abstract, references

Bibliometrics: Downloads (6 Weeks): 0,   Downloads (12 Months): 23,   Citation Count: 0

Currently long distance quantum communication is limited by the photon loss. We describe a quantum error correction scheme that can increase the *effective* absorption length of the communication channel. This device can play the role of a quantum ...

14 Classical versus quantum communication complexity

Amnon Ta-Shma
September 1999   ACM SIGACT News,   Volume 30 Issue 3
Publisher: ACM

Full text available: Pdf (646.32 KB)   Additional Information: full citation, abstract, cited by, index terms

Bibliometrics: Downloads (6 Weeks): 0,   Downloads (12 Months): 39,   Citation Count: 3

Classical communication complexity has been intensively studied since its conception two decades ago. Recently, its quantum analogue, the quantum communication complexity model, was defined and studied. In this paper we present some of the main results ...

15 A quantum no-key protocol for secure data communication

Yoshito Kanamori, Seong-Moo Yoo, Mohammad Al-Shurman
March   ACM-SE 43: Proceedings of the 43rd annual Southeast regional
2005   conference - Volume 2,   Volume 2
Publisher: ACM

Full text available: Pdf (340.64 KB)   Additional Information: full citation, abstract, references

Bibliometrics: Downloads (6 Weeks): 4,   Downloads (12 Months): 47,   Citation Count: 0

Since classical cryptography relies on difficulty and infeasibility of computation to find the plain text, the cryptography is losing security more and more as computational power is increased by technical innovations. Therefore, unconditionally secure ...

16 Quantum information processing and communication: the computer science perspective

Philippe Jorrand
March 2007　ACM-SE 45: Proceedings of the 45th annual southeast regional conference
Publisher: ACM

Full text available: Pdf (69.00 KB)　　Additional Information: full citation, abstract, index terms

Bibliometrics: Downloads (6 Weeks): 5, Downloads (12 Months): 58, Citation Count: 0

Information is physical: the laws which govern its encoding, processing and communication are those of its unavoidable physical embodyment. In today's computing, information obeys the laws of Newton's and Maxwell's classical physics: this assertion holds ...

17 Limits on the ability of quantum states to convey classical messages

Ashwin Nayak, Julia Salzman
January 2006　Journal of the ACM (JACM), Volume 53 Issue 1
Publisher: ACM

Full text available: Pdf (171.65 KB)　　Additional Information: full citation, abstract, references, index terms

Bibliometrics: Downloads (6 Weeks): 8, Downloads (12 Months): 100, Citation Count: 0

We revisit the problem of conveying classical messages by transmitting quantum states, and derive new, optimal bounds on the number of quantum bits required for this task. Much of the previous work on this problem, and on other communication tasks in ...

Keywords: Communication complexity, Holevo bound, Inner Product function, entanglement-assisted quantum channel, information theory, lower bounds, privacy amplification, quantum communication, shared entanglement, superdense coding

18 Infrastructure for the quantum internet

Seth Lloyd, Jeffrey H. Shapiro, Franco N. C. Wong, Prem Kumar, Selim M. Shahriar, Horace P. Yuen
October 2004　ACM SIGCOMM Computer Communication Review, Volume 34 Issue 5
Publisher: ACM

Full text available: Pdf (726.84 KB)　　Additional Information: full citation, abstract, references, index terms

Bibliometrics: Downloads (6 Weeks): 7, Downloads (12 Months): 73, Citation Count: 0

A team of researchers from the Massachusetts Institute of Technology (MIT) and Northwestern University (NU) is developing a system for long-distance, high- delity qubit tele-portation. Such a system will be required if future quantum computers are to ...

Keywords: entanglement, quantum communication, quantum memory, qubits, teleportation

19 Dense quantum coding and quantum finite automata

Andris Ambainis, Ashwin Nayak, Amnon Ta-Shma, Umesh Vazirani
July 2002 Journal of the ACM (JACM), Volume 49 Issue 4
Publisher: ACM

Full text available: Pdf (165.61 KB)   Additional Information: full citation, abstract, references, cited by, index terms

Bibliometrics: Downloads (6 Weeks): 9, Downloads (12 Months): 79, Citation Count: 6

We consider the possibility of encoding m classical bits into many fewer n quantum bits (qubits) so that an arbitrary bit from the original m bits can be recovered with good probability. We show that nontrivial quantum codes exist ...

Keywords: Automaton size, communication complexity, encoding, finite automata, quantum communication, quantum computation

20 Communicating quantum processes

Simon J. Gay, Rajagopal Nagarajan
January 2005   POPL '05: Proceedings of the 32nd ACM SIGPLAN-SIGACT symposium on Principles of programming languages
Publisher: ACM

Full text available: Pdf (247.88 KB)   Additional Information: full citation, abstract, references, cited by, index terms

Bibliometrics: Downloads (6 Weeks): 6, Downloads (12 Months): 83, Citation Count: 7

We define a language CQP (Communicating Quantum Processes) for modelling systems which combine quantum and classical communication and computation. CQP combines the communication primitives of the pi-calculus with primitives for measurement and transformation ...

Keywords: formal language, quantum communication, quantum computing, semantics, types, verification

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